Weather and Climate

Wrangell-St. Elias Summer 2014 Weather Summary

Summer Temperatures 2014

In Gulkana, June temperatures were below normal for most of the month. The low temperature of 34° F on June 23 tied the previous record set in 1968. Overall, June 2014 was 3.1° F colder than normal. It warmed up the first week of July with a temperature of 81° F recorded on the 5th, the highest temperature of the summer. On July 14, the minimum temperature of 33° F set a record for date. July ended up at 0.2° F cooler than normal. August temperatures were near normal for the month and the monthly average was 52.8° F (note missing data Aug. 8-12). The coldest August on record (1949-present) was 47.7° F in 1969 and the warmest August was 1994 with an average monthly temperature of 59.2° F (Figure 1, Table 1).

In Yakutat, the monthly mean temperature for June was 49.9° F compared to a normal of 50.8° F. Temperatures warmed the end of the month, with higher than normal temperatures June 27-July 3. The highest temperature recorded for the summer was 69° F on July 3. The first half of July was warmer than normal, and the second half of the month was cool. The low temperature of 39° F on July 21 broke the old minimum daily record of 40° F set in 1964. The lowest and highest temperatures for August were recorded on the same day, August 21. The low temperature of 40° F and high of 64° F is an exceptionally large diurnal range for Yakutat. Overall the month of August was 0.8° F warmer than normal. (Figure 1, Table 3).

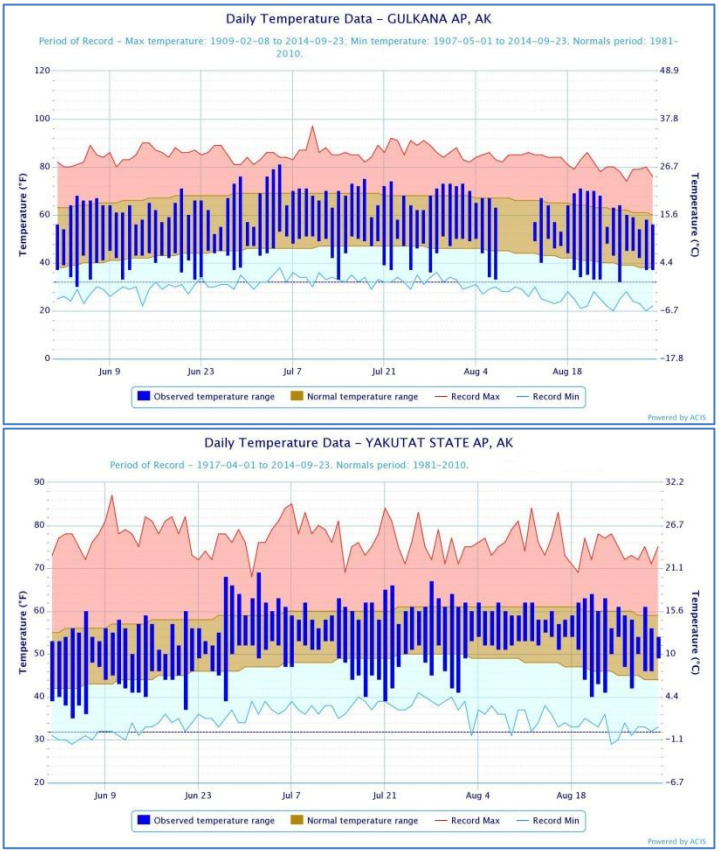

Figure 1. Summer 2014 daily temperatures at Gulkana, Nabesna, and Yakutat showing record maximum (red), record minimum (blue), normal (brown) and **2014 observed** daily range (blue).

Summer Precipitation 2014

In Gulkana, the dry spring came to an end and June precipitation was 144% of normal. Most of the 2.02 inches of precipitation fell during the last week of the month. July precipitation was also well-above normal with a total of 2.26 inches of rainfall. Normal is 1.81 inches. 0.60 inches of rain fell on July 1, and another 1.2 inches fell from July 10 to July 19. Early August was dry, but 1.2 inches of rain fell from August 13 to August 18. 0.8 inches of precipitation was recorded on August 17, a record for the date. Overall, August precipitation was 105% of normal. 6.17 inches of rain fell in summer 2014, compared to a normal seasonal total of 5.01 inches. The wettest summer was 1975 with 7.72 inches of precipitation (Figure 2, Table 1)

In Yakutat, the first week of summer was dry. By week two of June, conditions changed and 0.90 inches or more of precipitation was recorded on June 7, 13, and 17. Eleven days in June recorded 0.40 inches or more of precipitation. The total precipitation for June ended up at 10.10 inches compared to a normal of 6.39 inches, 158% of normal. July had 21 days with measureable precipitation, but the total precipitation for the month was less than June. 6.42 inches of precipitation were recorded in July, compared to a normal of 7.88 inches 82% of normal. August was by far the wettest month of the summer in Yakutat. Nine days had precipitation totals with an inch or more, including 4.07 inches of rain recorded on August 14. Although impressive, this didn't come close to the daily rainfall record of 7.07 inches on August 14, 1942. The steady and consistent rainfall in August totaled up to 23.17 inches, 165% of normal for the month. Summer precipitation ended up at 39.69 inches, the wettest summer since 1991. (Figure 2; Table 3)

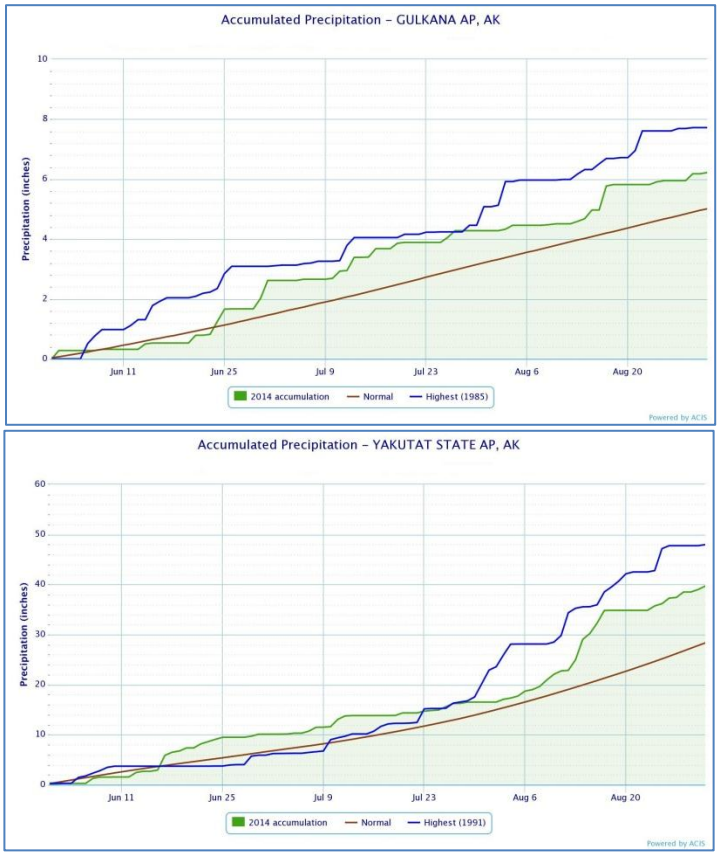

Figure 2. Spring **2014** accumulated precipitation at Gulkana (top), and Yakutat (bottom).compared to **normal** (brown line). The **wettest summers** at Gulkana (1985) and Yakutat (1991) are shown in blue.

Table 1. Gulkana summer 2014 Temperature and precipitation compared to the 1981-2010 normal.

Gulkana Summer 2014	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
June	51.3	54.4	-3.1	76 / June 29	30 / June 4
July	57.4	57.6	-0.2	81 / July 5	33 / July 14
August	52.8	53.5	-0.7	73 / Aug 2	32 / Aug 26

Summer Season Temperature Departure from Normal: -1.3°F

Gulkana Summer 2014	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
June	2.02	1.40	+0.62	0.43 / June 24	10
July	2.26	1.81	+0.45	0.60 / July 1	12
August	1.89	1.80	+0.09	0.80 / Aug 17	11

Summer Season Temperature Departure from Normal: +1.16 inches (123% of normal)

Table 2. Yakutat Summer 2014 Temperature, Precipitation, and Snowfall compared to the 1981-2010 normal.

Yakutat Summer 2014	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
June	49.9	50.8	-0.9	68 / June 27	35 / June 4
July	54.7	54.3	+0.4	69 / July 2	39 / July 21
August	54.6	53.8	+0.8	64 / Aug 21	40 / Aug 21

Summer Season Departure from Normal: +0.1°F

Yakutat Summer 2014	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
June	10.10	6.39	+3.71	2.93 / June 17	20
July	6.42	7.88	-1.46	1.45 / July 11	21
August	23.17	14.07	+9.10	4.07 / Aug 14	23

Summer Season Departure from Normal: +11.35 inches (140% of normal)

Table 3. Summary of weather statistics from WRST climate stations. All data are preliminary and subject to review.

Site	Elev. (ft)	Average Temp °F			Rainfall (inches)			Peak Wind Speed (mph)
		June	July	Aug	June	July	Aug	Summer
Chicken Creek	5420	40.2	46.5	45.1	4.87	4.42	1.23	27
Chisana	3318	47.4	53.5	59.9	3.96	2.16	1.31	25
Chititu	4616	40.8	46.3	45.5	4.06	2.31	1.66	41
Gates Glacier	4060	41.5	47.4	46.3	3.69	3.00	4.49	24
Klawasi	3045	47.6	54.1	51.6	1.05	2.27	3.89	45
May Creek	1600	51.0	55.7	53.3	3.05	2.02	1.52	19
Tana Knob	3739	M	49.1	48.2	M	1.86	2.32	16
Tebay	2000	47.6	52.1	49.9	1.83	1.55	3.57	13

Interesting notes from RAWS stations:

- The average June temperature since 2005 at Chicken Creek is 43.7° F. At 40.2° F, June 2014 was the coldest June of the 10-year record.

- The Gates Glacier site is about 2500 feet higher than nearby May Creek, and summer temperatures average about 8° F cooler at Gates Glacier.

- Most sites had less precipitation in August compared to June and July. However, monthly rainfall totals at some sites south of the Wrangells (Gates Glacier, Klawasi, Tebay) were wettest in August.

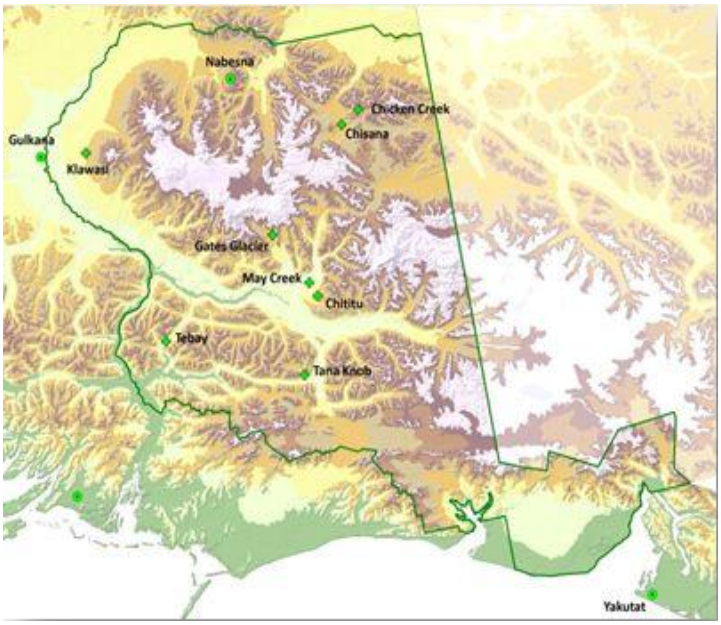

Figure 3. Map of NPS stations in Wrangell-St. Elias National Park and Preserve.

Climate Monitoring in Wrangell-St. Elias National Park and Preserve

The NPS climate stations in Wrangell-St. Elias are approaching the 10-year mark for climate monitoring (Figure 3). The NPS stations complement long-term records available from the National Weather Service stations in Gulkana and Yakutat. The NPS stations are providing critical data at higher elevations which helps characterize climate gradients and patterns affecting resources in Wrangell-St. Elias National Preserve. Table 3 summarizes the summer weather data for NPS sites.

We have added phenology cameras to some of the climate stations. These cameras capture images four times per day; the images are downloaded once a year. The images are used to help quantify the snow season, green-up period, and other basic phenologic information.

Long-term Summer Temperature Trends

At Gulkana, the average summer temperature for 2014 was 53.8° F, which is 1.3° F cooler than the 1981-2010 normal (the latest climate normal period) and 1.1° F degrees cooler than the long-term average (1949-2014).

We calculate the average summer temperature by simply taking the average of June, July, and August monthly temperatures. Average summer temperatures show great variability with a range between 51.6° F in 1949 and 59.4° F in 2004.

At Gulkana, the overall increasing trend of 0.12° F per decade for summer temperatures is not statistically significant based on a simple linear regression (p=0.22). Figure 4 shows the high variability of summer seasonal temperatures from 1949-2014.

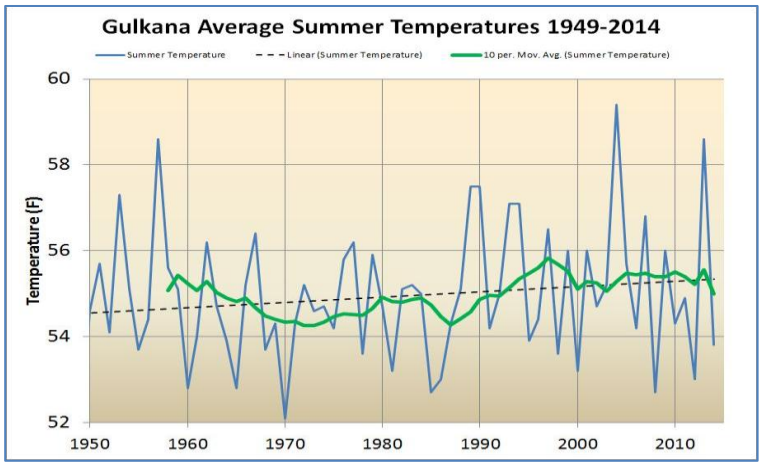

Figure 4. Average summer (June, July, August) temperatures in Gulkana since 1949. The green line shows the 10-year moving average. The dotted line shows a simple linear regression trend.

At Yakutat, the average summer temperature for 2014 was 53.1° F, which is 0.1° F warmer than the 1981-2010 normal (the latest climate normal period) and 0.6° F degrees warmer than the long-term average (1949-2014). Summer temperatures show great variability with a range between 47.9°F in 1965 and 55.4° F in 2004.

At Yakutat, the overall increasing trend of 0.32°F per decade for summer temperatures is statistically significant based on a simple linear regression (p<0.01). The 10-year moving average shows the coolest period in the mid-1970s. On average, the summer period over the past ten years has been about 1.0°F warmer than the long-term mean. (Figure 5).

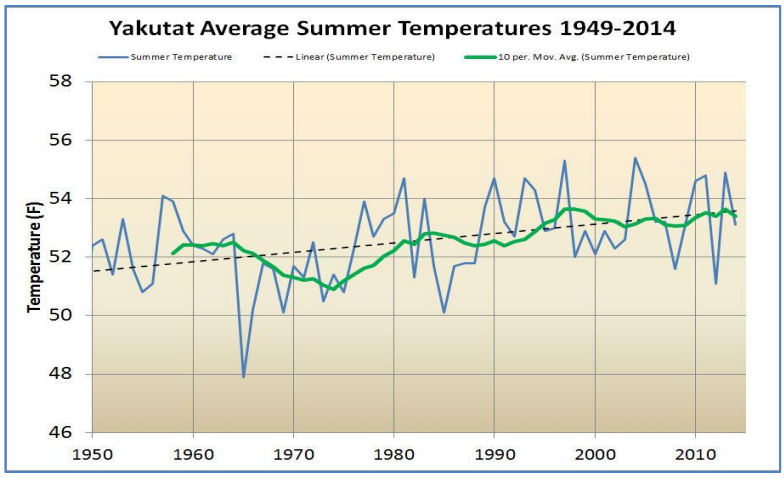

Figure 5. Average summer (June, July, August) temperatures in Yakutat since 1949. The green line shows the 10-year moving average. The dotted line shows a significant (p<0.01) linear regression trend.

Connecting Further

- New paper published – Recent Sea Ice Increase and Temperature Decrease in the Bering Sea area, Alaska
- Previous weather summaries and other climate monitoring documents on the Central Network web portal
- Access near real-time data from Western Regional Climate Center and MesoWest
- Statewide summary of weather highlights in the latest Alaska Climate Dispatch from the Alaska Center for Climate Assessment and Policy
- Map of projected temperature and precipitation changes for Wrangell-St. Elias National Park and Preserve.

More Information

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